

STATEMENT OF THE HONORABLE RICARDO MARTINEZ, M.D.  
**ADMINISTRATOR**  
NATIONAL HIGHWAY TRAFFIC SAFETY **ADMINISTRATION**  
BEFORE THE  
**SUBCOMMITTEE ON TELECOMMUNICATIONS, TRADE AND**  
**CONSUMER PROTECTION**  
HOUSE COMMITTEE ON COMMERCE

**April 28, 1997**

Mr. Chairman and Members of the **Subcommittee**:

Thank you for your invitation to appear before you to testify on air **bags** and child safety. With me **today are** Phil **Recht**, our Deputy Administrator, Ralph **Hitchcock**, our Acting **Associate** Administrator for Research and Development, James **Hedlund**, our **Associate** Administrator for Traffic **Safety** Programs, and Robert Shelton, our Associate Administrator for Safety Performance Standards.

Mr. Chairman, air bag **safety** and child **safety** are the **front-page** issues of motor vehicle safety today. These issues deserve our utmost attention and I want to thank you for providing this forum to discuss **them**. In my remarks about them I want to sound one consistent **theme**: In a frontal crash, distance provides safety. The further you are from the steering wheel, instrument panel, and windshield, the safer you are. This is true for air bag safety, but it is equally true for child safety seats and for persons wearing safety belts. That is why the Air Bag Safety Campaign has adopted the theme "Buckle **Up!** Children in Back!" I **will** return to this theme again and again.

**Last year**, nearly 42,000 Americans died and over 3.4 million were injured on our roads, at a cost to the country of **over** \$150.5 billion. Motor vehicle **crashes are the leading cause** of death of children, teenagers, **and young** adults. They are the leading cause of head injuries for **all** age **groups**. Head injuries, in turn, are the leading cause of fatalities in motor vehicle crashes.

Motor vehicle injuries occur as the result of the violent forces that occur in what has **been** called the "second **collision**." When a vehicle crashes, it **stops suddenly**, **The** occupants move at the original speed of the vehicle until they, too, contact something. If they hit the steering wheel, windshield, or dashboard at high speed, the result can be serious or fatal injury. **If they** are properly restrained, the restraint helps **them** keep a distance **from these** objects and reduces the chance of such injury.

Safety belts help **to** prevent or reduce **the effects** of this second collision, and cut by half the risk of death or serious injury in crashes, saving **9,500** lives annually. **Child** safety seats are **even more effective** in protecting small children: when used properly, they can reduce **fatalities** and serious **injuries** by 70 percent.

We have made **significant progress in the use** of these life-saving systems. Since 1984, safety belt use rates have increased from 14 percent to the current rate of 68 percent. However, the safety belt use rate **has leveled off in the last three years**. **Nearly one-third of Americans still** do not buckle up and 80 percent of child safety seats are not used properly.

Safety belts have limitations. By itself, the safety belt cannot always prevent an occupant **from** striking the steering wheel or instrument panel in a frontal crash. A combination of slack in

the shoulder belt, stretching of the shoulder belt webbing, and flexion of the occupant's neck often allows the head to hit the steering wheel or instrument panel in a crash. In a frontal crash the air bag supplements the safety belt by keeping the head from striking the steering wheel or instrument panel. This is one main benefit of the air bag for belted occupants.

An air bag also works together with safety belts to prevent the concentration of too much force on the body. Safety belts concentrate crash forces along narrow lines across the body, while air bags spread out the forces. This can be particularly valuable for a person who has a condition such as osteoporosis that makes the body especially fragile, if the person is not sitting too close to the air bag.

The air bag provides supplemental protection to belt wearers in these severe crashes and substantial protection to those who do not wear their safety belts. Overall, in frontal crashes of all types, air bags reduce both driver and front passenger deaths by about 18 percent, and passenger deaths by about 11 percent. In direct head-on collisions, air bags are even more effective, reducing driver and frontal seat passenger deaths by at least 27 percent. And they are dramatically reducing the incidence of critical and serious injuries to the head and upper body.

These are benefits that we must preserve. As of April 15, 1997, more than 1,900 drivers and passengers are alive because of air bags. The number saved increases each year. About 600 were saved in 1996 alone. If the current trend continues, we estimate that when air bags are installed in the entire fleet about 3,000 people will be saved every year. Thousands more have been spared the debilitating effects of head injuries.

It is the other side of air bag performance that has received the headlines. As of April 1997, there were 63 confirmed reports of deaths caused by air bags. Of these, 38 were young children, 3 were adult passengers, and 22 were drivers. These deaths occurred in low-speed crashes and, except in a handful of cases, involved occupants who were unbelted, or infants in rear-facing infant seats who were placed in the front seat. All who died as a result of an air bag deployment were extremely close to the air bag when it deployed, and almost all were unbelted or improperly belted. They did not have the distance they needed to allow the air bag to protect them.

The data have given us life-saving information concerning what each of us can do now to minimize our risks and maximize our benefits. The problem is being too close; the solution is to increase the distance between the air bag and us.

I want to take a moment to explain why distance is so critically important. When an air bag deploys in a crash, it generates extremely high forces. In the first 2 or 3 inches from the steering wheel or the first 4 to 6 inches from the dashboard, the fabric of the air bag is moving at maximum velocity. Within this zone, an air bag can push against an occupant with enough force to cause serious or even fatal injuries to the head, neck, or chest. Most occupants can avoid this zone by wearing the lap and shoulder belt and sitting as far back as is comfortable. The vast majority of air bag-induced serious injuries and fatalities have been to unbelted drivers, unbelted children, and to infants in rear-facing car seats who were in that risk zone when the air bags began to inflate. The rare cases of serious or fatal injury to belted occupants have occurred when belted drivers or passengers have slumped forward into the risk zone due to falling asleep or illness, or leaned far forward into the risk zone for some reason just as the crash occurred and the air bag began to inflate.

So, how do we minimize the risk of injury in a crash from the steering wheel, dashboard,

or **from** the air bag? We should **always** follow three simple steps:

- **First, always “Buckle up”.** Safety belts are the first and most important protection against crash injury **of any type**.
- Second, **“Give yourself room”.** While wearing a **lap/shoulder** belt is the best thing you can do to **protect** yourself in a crash, the **further** you are **able** to sit **from** the steering wheel, dashboard, or air bags, the **less likely** you will be injured in a crash
- **Third, “Place infants and children in the rear seat and ensure they are properly restrained, by a child safety seat or bdt appropriate for their size.”** The rear seat is safer than **the front** seat for anyone.

We are **all familiar** with the violence of car crashes. If an occupant fails to wear **a** safety belt, a frontal crash propels the occupant forward into the **steering** wheel, dashboard, or windshield. Because the windshield is usually far enough away **from** the driver or **passenger**, **wearing** the lap/shoulder **belt** holds them in their seat in a frontal **crash** and **usually**, except in the very severe crashes, keeps their face and head from hitting the **windshield**. In low-speed **frontal** crashes, the lap and shoulder belt can usually keep the **driver’s** head from hitting the steering wheel, or the passenger’s head from hitting the dashboard. However, in a severe frontal **crash**, such as the **35 mph crashes** into a concrete barrier that NHTSA runs as a part of its New Car Assessment Program, conducted with fiftieth percentile, **average-size** male test dummies, the lap/shoulder belt alone cannot always stop the driver’s **face** and head from smashing into the steering wheel, or the passenger’s face **and** head from smashing into the dashboard. Stretch in the belt system, stretch of the belt webbing material, and rotation of the occupant’s head and neck, can propel even a belted occupant’s face and head forward as much as two feet, slamming into the steering wheel or dashboard. Serious face and brain injuries do happen even **for** occupants who wear **their** lap and shoulder belts.

For that reason, it is always important for all drivers to sit **as far back from** the steering wheel as comfortably possible, and **for all** passengers to sit as far back **from** the dashboard as possible. **The critical issue** is not the driver’s or passenger’s height, but rather how close they are to the steering wheel or dashboard. Their closeness determines how likely it is that they will **hit** their face or head on those parts of the car in a frontal **crash**. For normal and even for taller drivers and passengers who prefer to sit closer to the steering wheel or **dash**, their taper size and extra weight **means that their** head can rotate **further** toward **these** components, and the shoulder belts **will** stretch more so that even they should try and sit farther away if possible.

For these drivers, and for shorter drivers who must naturally sit closer to the steering wheel and pedals, the following steps can be taken to “Give **Yourself Room**”. First, adjust the seat as far rearward as possible **and still** be able to comfortably and safely reach the brake, accelerator, and clutch pedals. **Then**, adjust **the** seat height and/or seat back angle to be as **far away from** the steering wheel as possible and also to have good **visibility** and a comfortable grip of the steering wheel. These simple steps should **help maximize** the distance between the driver and the steering wheel, and thus reduce the chance of hitting it with your face and head in a **crash**, whether or not the car has an air bag.

For vehicles with air bags, **if the** steering wheel has a tilt adjustment, our research suggests that tipping it downward could reduce the possibility of an air bag-induced injury in certain **situations**. For passengers of all **sizes**, moving the seat **rearward** as far as possible will reduce the chances of hitting the dashboard or being injured by an **inflating air** bag.

**Our** limited testing and much of the research conducted over the years indicate that some drivers sit **with** their chest as **close as** 8 to 10 inches from the **center** of the steering wheel. Since there have been over 1 million air bag deployments and **only** a few deaths of belted drivers attributed to air bags, we estimate that sitting 8 to 10 inches **from** the center of the steering wheel is a relatively safe distance. If the suggested **seat** and posture adjustments I **mentioned earlier are followed** and a person's chest is at least 8 to 10 inches **from** the center of the steering wheel, the air bag should provide **benefits** in a crash with a minimal chance of injury in the **risk** zone. If a driver's chest tends to come closer than 8 to 10 inches from the center **of the** steering wheel, that person may **want to consider** pedal adjusters or a seat cushion, or both, to provide greater distance from the steering wheel.

Overall, **air bags** are **effective** in preventing death and injury to both **unbelted** and belted occupants. They are especially **effective** in preventing injuries to the head, face and upper body. **They have** resulted in some increased hand and **arm** injuries as they deploy, and, because **they** save many lives in very **serious crashes**, air bag survivors of these high speed crashes sometimes have serious foot or leg injuries due to intrusion of the vehicle **footwell** and collapsing of the dash structure due to the high **speed**.

As I stated at the beginning of my remarks, to maximize the air bag effectiveness and minimize the small possibility of air bag induced injuries, everyone needs to take three steps: first, "Buckle Up"; second, "Give Yourself Room"; and **third**, "Infants and Children **Always in the Rear Seat Properly Belted**."

**Now** I would like to turn to the comprehensive approach NHTSA has taken maximize the benefits and reduce the **risks** of air bags.

As **an** emergency physician, I was deeply concerned when I learned that this life-saving device has also taken life. The agency had first picked up warning **signals** in 1991 during its testing of early passenger-side air bags. When **a** rear-facing child safety seat was placed in the front passenger seat and the **air** bag was deployed, **the** forces recorded by a child dummy in the seat showed that there was a significant risk of serious or fatal injury. The agency immediately took steps to warn the public of the risk to **infants**, and required warning labels for the vehicles and for the seats themselves. These **warnings** were issued before the first infant fatality was reported.

At about the same time, NHTSA received the **first** reports of driver fatalities that appeared to be air bag-related. The agency organized **a special crash investigation team to examine** any reports of air bag-related fatalities. During the **three** years **from** 1991 to 1993 there were scattered reports of such fatalities -- two or **three** a year -- but no clear trend or pattern. Most of the fatalities were in vehicles manufactured in model years 1990 and 1991, and it was speculated that these early-production **vehicles** might be anomalous,

The next year, 1994, marked a turning point. Passenger air bags were now entering the **fleet** in **significant** numbers, with sometimes **tragic** results. The agency investigated five crashes in which children suffered fatal injuries **from** the passenger air bag. **It was evident that something** was going **wrong**. **Some** of these **children** had been riding in rear-facing seats, but the

others were older **children**, who appeared to have been **very** close to the air bag at the instant it deployed. The agency stepped up its **inquiry** into the explanations for these events. The industry, also alarmed at these fatalities, suggested the first **rulemaking** action to address the risk **to** children: an amendment to the standard that would permit an air bag cutoff switch to be installed in vehicles that lacked a rear seat large enough to accommodate a rear-facing infant seat. We responded with an amendment that became effective in 1995 and that has enabled *the* manufacturers to install cutoff switches in these vehicles.

But the increase in **fatal** injuries to children continued. There were **8** in 1995. In October 1995 we issued a public warning about the risk to children, advising parents in the strongest possible terms to place **their** children in the **rear seat whenever** possible and never to carry infants in rear-facing child seats in the front seat of **an** air bag-equipped vehicle.

In November 1995, we issued a request for public comments on air bag safety, opening the door to suggestions **from** all sources about how to reduce or eliminate the risks presented by air bags. We received over a hundred comments, many of them **very** constructive, but we found that hard data was lacking on the actual **benefits** that could be expected from measures such as depowering the air bag.

By the beginning of 1996, we had also entered a new phase of research. We concluded that existing data **from** industry sources was inadequate, and that we would have to conduct our own evaluation of measures to modify air bag **performance**. We undertook an emergency research program at our Vehicle Research and Test Center and called on the manufacturers to provide us with whatever **modified** systems they had, in a concerted effort to see **if these** modifications would reduce the risk to **children** without significantly diminishing the protection provided to adults.

We continued this research throughout the spring and summer of 1996, even as we ~~we\*~~ **developing** plans to modify the standard in ways that would facilitate changes to air bags that might prove helpful to children and at-risk adults.

**Time** was of the essence, because **child** fatalities continued to rise throughout 1996. By year's end, the count stood at 34. Nine were infants in rear-facing seats, 21 were older **children** riding **unrestrained in the front seat**, and four were older children using some type of restraint.

By August, we were **ready with a** rule-making proposal to address the problem. We had tentatively concluded that the emergent need was for greatly enhanced warning labels in air **bag-**equipped vehicles and on child safety seats, and that the **warning** labels should remain in vehicles until the current generation of air bags could be replaced by so-called "**smart**" air bags. We described the new labels, proposed a definition for smart air bags, and announced our intention to require **smart air bags**.

The motor vehicle industry's response to our proposal **was affirmative** with respect to the warning labels, but skeptical on the issue of smart air bags. Instead of smart air bags, the manufacturers favored a general depowering of air bags, arguing that this would be the fastest and best way to reduce the risk to children. In late August, the American **Automobile** Manufacturers Association (**AAMA**) petitioned the agency to amend the standard to adopt a test using unbelted dummies seated on an acceleration sled with a **standardized** crash **pulse in place of the** barrier crash test **with** unbelted **dummies**. **After** extended discussions between the agency and **AAMA** over the merits of the sled test, AAMA amended its **petition** in mid-November by making the **crash** pulse more severe and by proposing the addition of neck injury criteria to the

standard. Within 10 days we held a press conference at which we announced not **only** the final rule on **labeling**, which has now **become** effective for new vehicles, but also our plans to move ahead with **rulemaking** to depower air **bags**.

On January 6 of this year, we published **three rulemaking** notices: a **final** rule extending the period within **which manufacturers** can install cutoff switches in vehicles without **rear** seats; a **proposal to depower air bags, either by increasing the chest g's from 60g to 80g or by permitting the use of the sled test in place of the barrier test for unbelted testing**; and a proposal to permit dealers and repair shops to deactivate air **bags** upon informing vehicle owners of the benefits and risks of air bags and **receiving** written authorization **from** the owners.

In March, we issued a final **rule** on our **depowering** proposal. In it, we have adopted the **AAMA** proposal as an alternative to the barrier crash test for vehicles manufactured before model year **2002**. We believe that **this** measure will **permit** the manufacturers to depower their air bags by up to 35 percent, a level of **depowering that** should result in significant benefits to children and at-risk adults. **The manufacturers have stated in their comments that the sled test will permit them to certify their depowered air bag systems in a very short time, and we anticipate that they will do so wherever they believe depowering is appropriate.**

We **have** a lot of work ahead of us. We are reviewing the comments on our proposal to permit the deactivation of air bags. Air bag deactivation is one of several steps the agency is considering taking as a temporary measure until advanced systems can be developed and installed. We are now in **the final** stages of deliberation in this matter and expect **to issue a final rule in the near future.**

We **are** also working hard with the motor vehicle industry to see what can be done to incorporate advanced features into air bag systems that will help us reach the goal of protecting children and at-risk adults without compromising **safety** for other **occupants**. **We** are meeting with the companies individually to discuss their improved air bag **technologies**. **The industry as a whole will participate in a new subcommittee of our Motor Vehicle Safety Research Advisory Committee to share nonproprietary information about air bag technology. I am greatly encouraged by the industry's willingness to work collegially on air bag safety. I strongly believe that the result of this cooperation will be increased safety for everyone.**

We are also planning to issue an **NPRM** to require phasing-in of advanced air bags and to establish performance requirements for those air **bags**. On February 11 and 12, we held a public technical workshop to discuss appropriate test procedures and other **issues** related to that **forthcoming** proposal.

At the **same time** that we were addressing the problem prospectively through research and **rulemaking**, we were actively working to educate everyone who transports children in the air bag-equipped vehicles now on the road. **Almost all** the children **injured** or killed by air bags were unrestrained or improperly restrained; all were sitting in the front seat. Thus there were three messages that every driver of a vehicle with air bags must know: "Air bags can be dangerous; everyone should be properly buckled up; children should sit in back"

We embarked on a massive public education campaign to **bring these messages to the American public** in a host of ways. In November 1995 we issued a press release highlighting the problem and solution. I sent a letter to over **200** groups asking their help in spreading the word. The **response** was **overwhelming**. Examples include articles in major magazines (including *Redbook*, *Good Housekeeping*, *Family Circle*, and *Sesame Street Magazine*); information to all

physicians, **nurses**, elementary schools, automobile dealers, law enforcement agencies, child seat **manufacturers**, AAA and National Safety Council chapters; and **information** included in publications and **notices** distributed to employees or customers of many businesses (such as Gerber Products and Midas International).

In January 1996, we issued a "Call to Action." At a public conference attended by more than 50 organizations, we laid the foundation for a **comprehensive** and coordinated approach to air bag safety. The **conference** participants agreed on a **three-pronged** strategy to address the problem: increased public education, improved **occupant** protection laws, and **high-visibility** enforcement of **these** laws. They also agreed that both public and private **efforts were** needed to carry out this strategy. The Call to Action **led** directly to the formation of the Air Bag **Safety** Campaign later in **the spring**. The Campaign, with over \$14 million in **funding** for two years from automobile **manufacturers**, occupant restraint system **suppliers**, and **insurers**, **has** conducted extensive and **effective** activities in each area. In particular, the Campaign has organized and coordinated activities **of over** 70 corporations and national organizations to ensure that the basic message -- "Buckle **everyone!** Kids in back!" -- reaches as many people as possible. In addition, individual companies, including each of the three domestic automobile manufacturers, **are** conducting **extensive** education campaigns around **these** themes.

These activities have been effective. By December, surveys indicated that parents who **transport** children under 12 were almost universally aware of the dangers posed by air bags and of the measures they should take to reduce these risks.

I would like to say a few words about our new seat **belt** and child safety seat initiative. President Clinton feels strongly that more must be done to encourage the use of these live-saving devices. On April 16, Secretary Slater responded to the President's call and released a national strategy to raise U.S. **seat** belt use to 85 percent by the year 2000. By 2005, our goal is to reach or exceed 90. We also have set a goal of reducing child occupant fatalities (**0-4** years) 15 percent by 2000, and 25 percent by **2005**.

Currently, with **an** estimated 68 percent of America's vehicle occupants buckling up, seat belts are saving about 9,500 lives a year. Achieving 85 percent seat belt use would boost the annual number of lives saved in U.S. highway crashes by about 4,200, and reduce **crash-related** injury costs by \$6.7 billion a year. **If 90** percent of vehicle occupants used their belts, more than 5,500 lives would be saved annually and injury costs would be cut by **\$8.8** billion.

Safety goals this ambitious cannot be reached without widespread support throughout the nation. With this in mind, we set a national four-point strategy:

- Building partnerships between government and the private sector to help America reach **its** potential of saving lives and preventing injuries through the use of seat belts and **child safety** seats;
- Enacting State **laws** for primary (standard) seat belt enforcement and comprehensive child passenger safety;
- Conducting active, high **visibility law enforcement** of State seat **belt** and **child** safety seat laws; and

- Expanding **well-coordinated**, effective public education programs,

The President took the first step to **help** achieve the seat belt use goal by issuing an **Executive** Order that requires Federal employees to wear safety belts while on official business, and encourages seat belt use for **all** persons in National Parks and **for** Government contractors, **subcontractors**, and grantees. The next step in our national strategy will be to seek similar commitments from State and local governments, national organizations, **businesses**, local communities, and most important, individual citizens. All can become **partners** in this effort to get America to buckle up so that together we can prevent many **of the tragic**, unnecessary **deaths** and injuries that **result** when people do not use child **safety** seats and seat belts.

The **final** leg of our **strategy** for child occupants addresses the issue of child seats themselves and how they fit -- or do not fit -- in cars. Many parents have complained about the complexity of this seemingly simple issue. Some seats do not **fit** in some cars. Others require special hardware. And the instructions for securing a seat in a car often are difficult to understand.

**NHTSA's** checkpoints show that up to 80 percent of child safety seats are misused. Statistics also show that every day an unrestrained child under the age of 5 is killed in a **traffic** crash. Child safety seats, when used properly, are the most effective **safety** devices available. **Used correctly**, they reduce the risk of fatality for infants and toddlers by **almost** 70 percent.

As with the broader problem of air bags, there are two solutions -- educating the public on proper procedures for current seats and cars, and **modifying** future seats and cars to eliminate the problem. **NHTSA's** Blue Ribbon Panel on this issue recommended actions to address both.

To educate the public, we have worked with many national **organizations** to train their state and **local** members, who in turn will educate parents in their communities. Law enforcement officers, nurses, fire and rescue personnel, and child care providers **all** are participating. In particular, the Emergency Nurses Association is working with automobile dealers to educate both dealer **staff** and conduct clinics for the public in automobile showrooms.

We are addressing the longer-term issue of building compatible child seats and cars through our proposal for a universal attachment system. **This** was the number one recommendation of the Blue Ribbon Panel. **In** February, we issued a proposed rule for a universal child safety seat attachment system. The comment closing date on the proposal is May **21st**.

Our notice proposes that, in two years, **all** new cars, light trucks and vans would be required to have uniform, universal "**soft**" attachment points in a standard location. **A top-**attaching tether will **provide** a secure **connection** between the top of the seat and the vehicle. **All** child safety seats would be required to have attachment points to match those in new vehicles.

There are more than 900 vehicle models with different **types** of safety belts, and there are over 100 models of child safety seats on the market **today**. The number of possible combinations of child seats with vehicle seats has caused enormous compatibility problems and **consumer confusion**. **We believe** our proposal will remove a source of **frustration** and unease for millions of **parents** and **help** increase the number of young children using safety seats. The effect of **our rule** will not **only** make child safety seats much easier to install, but will **eliminate incompatibility** problems and, in the process, save lives by making these seats more secure and easier to use. We estimate that our **proposal will** save 24-32 **lives** and 2,100-3,600 serious



**injuries per year** once it is **fully** implemented

Mr. Chairman, this concludes my statement. My **colleagues** and I would be pleased to answer any questions you might have.

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